

crenato-striatis, plus minus (præsertim circa humeros) dilutioribus, antennis, palpis pedibusque testaceis.

Variat immaturus colore fere testaceo.

Long. corp. lin. $2\frac{1}{3}$ — $3\frac{1}{3}$.

Habitat in insulis Canariensibus sub pedibus truncisque arborum prolapsis, hinc inde haud infrequens.

C. elongate-oblong, blackish brown (when immature, pale), and more or less densely clothed with a cinereous pile. *Prothorax* most closely and minutely punctulated all over; very large; exceedingly convex on the disk; widest about the middle, and with the sides regularly rounded; with the hinder angles produced and acuminate; and with the extreme front margin more or less rufescent. *Elytra* more or less diluted in colouring, —especially about the shoulders, which are sometimes almost rufescent; rounded at the sides (being widest about the middle); and regularly and deeply crenate-striated. *Antennæ, palpi* and *legs* testaceous.

The present beetle I conceive to be identical generically with the Porto-Santan *Coptostethus femoratus* (Ins. Mad. 240. tab. iv. f. 8); and it is the only member of the *Elateridæ* which I have been able to detect during a six months' research in the Canary Islands. It differs slightly, however, even in its *structural* characters, from that insect, and it is just possible therefore that it may prove eventually to be the type of a separate, though closely allied, genus; but I defer the consideration of its affinities until a future opportunity (when I shall have had leisure for dissecting the parts of its mouth), contenting myself now with simply securing the *species*, which I believe to be unquestionably new. Should it prove to be a true *Coptostethus*, it will be of the greatest interest geographically, as establishing a powerful connecting link (like many others hereafter to be noticed) between the Madeiran and Canarian groups; for whilst the *C. femoratus* is the only representative of the *Elateridæ* which I have hitherto observed in the former, the present insect (which has precisely similar habits) would seem, singularly enough, to be the sole exponent of that immense family in the seven large islands of the latter.

XXII.—On the Habits and Reproduction of some Marine Animals.
By M. COSTE*.

By the generosity of the Emperor, and the kindness of the Minister of Public Works, I have been enabled to place the pilot Guillou in a position to organize, in the shed which covers

* Translated from the 'Comptes Rendus,' July 12, 1858, p. 45.

his lobster reservoirs on the Quay of Concarneau, an observatory, if I may be allowed to use the expression, for the investigation of the living products of the sea,—an observatory in which each species may be enclosed in a distinct cell, like the domestic animals nourished in the stalls of our stables.

A pump raises sea-water to the roof of this establishment, and accumulates it in a basin of supply, from which it falls in a continuous cascade in artificial channels, of 50 centimetres in width, arranged in gradations upon four stages, resembling, on a large scale, the hatching apparatus of the College of France. They are applied against the surrounding wall of the shed, and supported upon it by frameworks, occupying altogether a length of about 80 metres, over the lobster vivaria.

These artificial brooks, constructed of strong planks coated internally with a layer of Roman cement, are divided into ninety-five cells by partitions furnished with gratings, which afford a free passage to the current, without allowing the imprisoned species to communicate with each other. The greater part of the species thus separated in these compartments receive their nourishment like the terrestrial animals in our gardens of acclimatation, and thrive under this treatment as well as if they were in full liberty. They propagate there, and exhibit all the marvels of their instincts. We may watch their copulation, the deposition of their eggs, the development of their embryos, and all their metamorphoses, with as much facility as in the case of domestic animals; so that in a laboratory of this kind most of the animals inhabiting the sea might pass by turns under the eyes of the naturalist who is engaged in studying the laws of their organization, and reveal its mysteries to him.

Natural history, as understood by Réaumur, Huber, and Buffon, will find in this investigation, made in the midst of new conditions, inexhaustible subjects for pictures; and comparative embryogeny will extend its domain into regions from which it appeared to be interdicted.

Whilst waiting until my assistant, M. Gerbe, has executed the numerous plates belonging to our first investigations, and until I can present in his name a great work, completed under my directions, upon the metamorphoses of the Crustacea, the Academy will allow me to inform it of some of the results of our observations. I shall refer, in the first place, to the habits and the domestication of a dozen species of marine fishes, the investigation of which has enabled us to prove the accuracy of the acts related by the historians of antiquity.

Amongst the species isolated and fed in the cells of the establishment, some, such as the Old Wife (*Labrus bergylta*, Asc.), the Fifteen-spined Stickleback (*Gasterosteus Spinachia*, Linn.),

the Spotted Gunnell (*Gunnellus vulgaris*, Cuv. & Val.), the Grey Mullet (*Mugil Cephalus*, Linn.), and the Five-bearded Rock-Ling (*Gadus Mustela*, Linn.), come up to the surface of the water when we approach to give them something to eat, follow the movements which we make around them, allow themselves to be conducted towards any points to which it is desired to attract them, solicit their prey in the same way as tamed birds, and even come to seek it in the hand. The Rock-Lings are so familiar, that they may actually be captured, taken out of the water, replaced and recaptured, without attempting to make their escape.

The Gobies (*Gobius niger*, Linn., and *Gobius minutus*, Penn.) and the Sea-Scorpion (*Cottus Scorpius*, Cuv. & Val.), although not so familiar as those just mentioned, are nevertheless very attentive to all that takes place around them, and also come to take their food from the hand when it is presented to them.

The Turbot (*Rhombus maximus*, Cuv.), which from its physiognomy would be supposed destitute of expression, becomes animated nevertheless at the sight of the bait which is held out to him, and comes, agitating his broad fins, to take it from the hand; and when he is pressed by hunger, he will even float on the surface until his desires are satisfied, if he be made to wait. He swims with ease, and changes colour when he is irritated. The spots which are scattered over his body become paler and browner under the influence of the impression to which he is subjected. But the most striking point about him, is to see him, with apparently a narrow mouth, swallow, at once, fishes proportionally of enormous size. We have seen a young individual, not more than 25 centimetres in length, swallow sardines of the largest size without any difficulty.

The Pipe-fishes (*Syngnathus Typhle*, Linn.) present two curious peculiarities in their habits. They group themselves by interlacing their tails in such a way as to form tufts, and remain immoveable in a vertical position with the head upwards. When food is given to them, they move towards the prey as it is falling, follow it in its descent, and, as they approach it, perform a movement of rotation upon their axis, so as to turn the back downwards and the belly upwards. In this reversed position they precipitate themselves upon the prey, and do not resume their normal attitude until after they have seized it. This strange manœuvre is imposed upon them by the peculiar position of their mouth, which is cleft vertically at the extremity of a turned-up beak. The young animals, in which the buccal aperture has not this arrangement at the moment when they issue from the incubatory pouch, are not under the necessity of performing any such evolution. They seize their food in the same way as other fishes.

The results of these first observations are sufficient to prove the veracity of the historians of antiquity as regards the marvellous stories which they have transmitted to us of the spectacles furnished by the *nomenclators* in the marine piscinæ of Lucullus, Pollio, and the orator Hortensius. They prove that these statements, far from being fables, as people have been disposed to think, are really the simple expression of the truth.

The Crustacea enclosed in the compartments of the vivarium have also furnished us with interesting observations upon their mode of copulation, their oviposition, and their metamorphoses. In all the Brachyurous Decapods which we have been able to observe, such as the common Shore Crab (*Cancer Mænas*, Linn.), the *Xantho floridus* of Leach, the Arched-fronted Swimming-Crab (*Portunus Rondeleti*, Risso), the Marbled Swimming-Crab (*Portunus marmoreus*, Leach), the hairy Porcelain Crab (*Porcellana platycheles*, Penn.), the Spider-Crab (*Maia Squinado*, Herbst), the common edible Crab (*Cancer Pagurus*, Linn.), the minute Porcelain Crab (*Porcellana longicornis*, Lat.), &c., we have seen the male, by the agency of his copulatory styles, and through the sternal apertures, deposit the semen in a dilatation of the oviduct, a dilatation situated at the lower extremity of that canal.

In the Shore Crab (*C. Mænas*) the semen accumulated in this place of deposit becomes solidified and moulded there, acquiring the consistence of coagulated wax. It remains in this state for about a fortnight, after which it slowly becomes liquefied, in order that the spermatozoids, which are then disaggregated and suspended in the fluid resulting from this liquefaction, may ascend to the ovaries,—a phænomenon which lasts not less than two months. The ovarian eggs, which at the moment of copulation were still in the microscopic state, increase in proportion, but do not arrive at complete maturity until long after the complete disappearance of the seminal fluid. We are observing, in closed cases, specimens which copulated three months since, and which have not yet deposited their eggs. The dissection of some of these has shown us that the eggs are far from having attained the degree of development required for their expulsion. This fact proves two things:—1. That in these species the fecundation is ovarian; and 2. that when submitted to the influence of the male element, the ova are far more distant from the period of their maturity than is the case in any of those observed in other classes.

In the Long-tailed Decapods (*Macrura*) the semen is not introduced into an internal pouch, but it is poured out upon the sternum in the vicinity of the orifices which lead to the oviducts. In some, such as the Lobsters and Spiny Lobsters, it is spread

out in irregular plates upon a surface of considerable extent; in others, such as the Prawns and Shrimps, the semen is emitted in the form of spermatophora, which are attached to the plastron or to the base of the feet of the females. In these species, therefore, the spermatozoids must become disaggregated externally to reach the oviducts, without their being introduced there by the males. But the fecundation is not less ovarian than in the preceding, although it approaches more nearly to the period of oviposition. There are even species in which it only precedes the expulsion of the eggs by a few hours. Thus, for example, we have seen a Prawn (*Palæmon serratus*, Leach) copulate on one day and deposit its eggs on the next.

As all the Crustacea carry their eggs under the tail, or upon some other part of the body where the incubation takes place, and as this incubation is generally very slow (it does not last less than five or six months in the Lobsters and *Palinuri*), it follows that the animals of this class, in casting their shells, would have been liable to lose their progeny, unless, by an admirable combination, the periods of the oviposition had not been calculated in relation to those of the moults to which these species are annually subjected until they have acquired their definitive size. Thus, to obtain all the time necessary for incubation, nature has chosen that fecundation should take place immediately after the mothers have thrown off their old skins, in order that the new ones may be a sufficiently lasting protection.

We have seen a striking proof of this fact in the common Shore Crab and the Prawn of our coasts. The male of the former species selects a female, holds her tightly with the right foot of the second pair, carries her with him, whether he walks or swims, and seizes her again if they be separated. Some days after this union, the female, still held by the male, throws off her old covering; and immediately after this moult is effected, she turns to receive the semen,—an operation which lasts one, two, or three days.

In the Prawn (*Palæmon serratus*, Leach), the male does not take possession of the female before the moult, as in the common Shore Crab; but as soon as she has moulted, he pursues her, darts upon her back, clings there, and allows himself to be carried about without making any attempt at copulation as long as the female swims; when she stops, he glides under her by inverting the right side, deposits a double spermatophore upon her plastron in a few seconds, and then resumes his former position, to recommence the same manœuvre a moment afterwards.

There are some species which have two broods between each moult, and in which the copulation fecundating the first generation appears also to fecundate the second; of this w

believe we have a proof in twelve females of *Maia Squinado*, isolated in a basin, all of which have produced eggs a second time without another copulation, at the very moment when the last eggs of the preceding gestation had been hatched.

Such, amongst the numerous facts which we have observed, are those which I have thought it advisable to communicate at present to the Academy. At a subsequent meeting we shall present the general results of our observations upon the first metamorphoses of the Crustacea. From these observations it results that all the known *Zoëas* described by various authors are the larvæ of Brachyurous Decapods, and that it is not demonstrated that the typical *Zoëa* of Bosc is, as usually supposed, an embryo of the Edible Crab of our coasts, and still less of the Lobster.

In order that the investigations which have furnished us with these facts may not be interrupted during our absence, the pilot Guillou keeps a register, in which, in conformity with instructions drawn up beforehand, and which he follows with sagacity, he inscribes, at the number corresponding to each cell, whatever bears upon the experiments carried on therein. As soon as an interesting fact is exhibited, he informs us of it; and if the fact be of a nature capable of verification in Paris, he sends us the animals presenting it; in the contrary case, one of us goes to Concarneau to study the phænomenon on the spot.

XXIII.—*Characters of some apparently undescribed Ceylon Insects.* By F. WALKER.

Order COLEOPTERA.

Fam. Cicindelidæ.

CICINDELA DISCREPANS. Atra, elytris guttis duabus humeralibus vittisque duabus postice macularibus flavis, femoribus cupreis. Long. $6\frac{1}{2}$ —8 lin.

TRICONDYLA FEMORATA. Nigra, transverse rugulosa, prothorace sublineari antice coarctato, femoribus piceis, tibiis tarsisque cyanis. Long. 10 lin.

Fam. Carabidæ.

CYMINDIS RUFIVENTRIS. Ater, nitidus, antennis piceis, thorace sulcato, abdomine subtus rufo, elytrorum sulcis parallelis punctatis bene determinatis, pedibus piceis, femoribus crassis. Long. 4 lin.

DROMIUS MARGINIFER. Niger, nitidus, subtus piceus, palpis antennisque fulvescentibus, thoracis lateribus rufescentibus, elytrorum maculis duabus magnis humeralibus duabusque minoribus posticis discalibus rufescentibus. Long. $2\frac{1}{2}$ lin.